Paralell R-point implicit block method for solving higher order ordinary differential equations directly

ABSTRACT

Most of the existing methods for solving ordinary differential equations (ODEs) of higher order are sequential in nature. These methods approximate numerical solution at one point at a time and therefore do not fully exploit the capability of parallel computers. Hence, the development of parallel algorithms to suit these machines becomes essential. In this paper, a new method called parallel R-point implicit block method for solving higher order ODEs directly using constant step size is developed. This method calculates the numerical solution at more than one point simultaneously and is parallel in nature, thus suitable for parallel computation. Computational advantages are presented comparing the results obtained by the new method with that of conventional 1-point method. The numerical results show that the new method reduces the total number of steps and execution time. The accuracy of the parallel block and the conventional 1-point methods are comparable particularly when finer step sizes are used.

Keyword: Parallel R-point; Implicit block method; Higher order ODEs; Directly